

Proposed Revisions to Particulate Matter (PM) National Ambient Air Quality Standards (NAAQS):

Overview of levels/forms, ramifications, schedule

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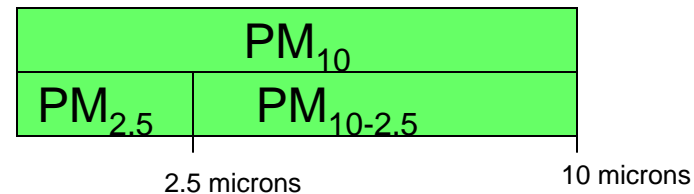
Air Quality Assessment Division, OAQPS

3/8/2006

PM NAAQS Proposals – Overview of forms/levels

Current NAAQS

| Pollutant | Indicator | Primary NAAQS | | | Secondary NAAQS |
|---------------------|-------------------|------------------------|--|-----------------------------|-----------------|
| | | Called | Form | Level | |
| fine particles | PM _{2.5} | Annual NAAQS | 3-year average of weighted annual mean | 15 µg/m ³ (LC) | same as primary |
| | | 24-hour or Daily NAAQS | 3-year average of annual 98th percentile value | 65 µg/m ³ (LC) | same as primary |
| inhalable particles | PM ₁₀ | Annual NAAQS | 3-year average of weighted annual mean | 50 µg/m ³ (STP) | same as primary |
| | | 24-hour or Daily NAAQS | expected exceedance (Not to be exceeded more than once per year on average over 3 years) | 150 µg/m ³ (STP) | same as primary |



- PM_{2.5} NAAQS since 1997
- PM₁₀ NAAQS since 1987
- EPA forced to (eventually) abandon PM₁₀ NAAQS due to double jeopardy associated with PM_{2.5}
- Note that PM₁₀ NAAQS is in STP (standard temperature and pressure) and PM_{2.5} NAAQS in LC (local conditions ~ what you actually breathe)

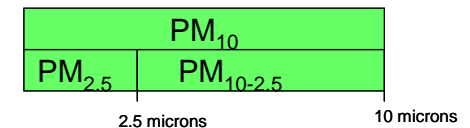
PM NAAQS Proposals – Overview of forms/levels

Proposed NAAQS

| Pollutant | Indicator | Primary NAAQS | | | Secondary NAAQS |
|-----------------------------|----------------------------------|------------------------|--|---------------------------|-----------------|
| | | Called | Form | Level | |
| fine particles | PM _{2.5} | Annual NAAQS | 3-year average of weighted annual mean | 15 µg/m ³ (LC) | same as primary |
| | | 24-hour or Daily NAAQS | 3-year average of annual 98th percentile value | 35 µg/m ³ (LC) | same as primary |
| 'thoracic' coarse particles | PM _{10-2.5} qualified * | 24-hour or Daily NAAQS | 3-year average of annual 98th percentile value | 70 µg/m ³ (LC) | same as primary |

* Qualified to include “any ambient mix of PM_{10-2.5} that is dominated by re-suspended dust from high-density traffic on paved roads and PM generated by industrial sources and construction sources, and excludes any ambient mix of PM_{10-2.5} that is dominated by rural windblown dust and soils and PM generated by agricultural and mining sources.”

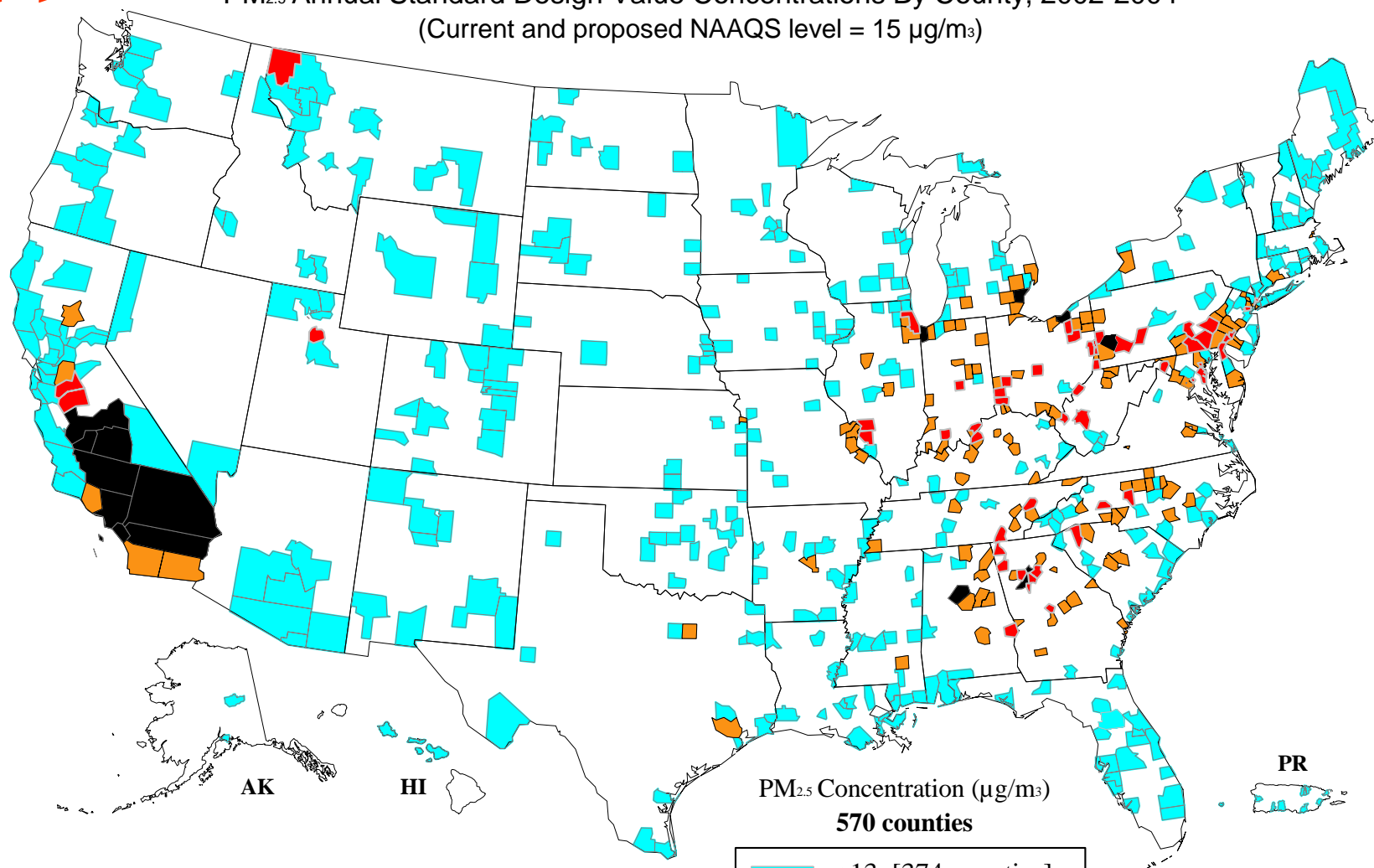
- NAAQS changes proposed in December 2005
- PM_{2.5} annual level retained
- PM_{2.5} 24-hour level strengthened (from 65 µg/m³ to 35 µg/m³)
- PM₁₀ NAAQS going away
- New coarse particle NAAQS focusing only on particles less than 10 microns but greater than 2.5 microns in diameter (PM_{10-2.5}) proposed
 - 24-hour only (no annual std); level = 70 µg/m³; in LC
 - Indicator is qualified



PM_{2.5}

PM NAAQS Proposals - Ramifications

PM_{2.5} Annual Standard Design Value Concentrations By County, 2002-2004
(Current and proposed NAAQS level = 15 µg/m³)



- Sixty-eight counties have one or more sites with concentrations that exceed the annual NAAQS level of 15 µg/m³.

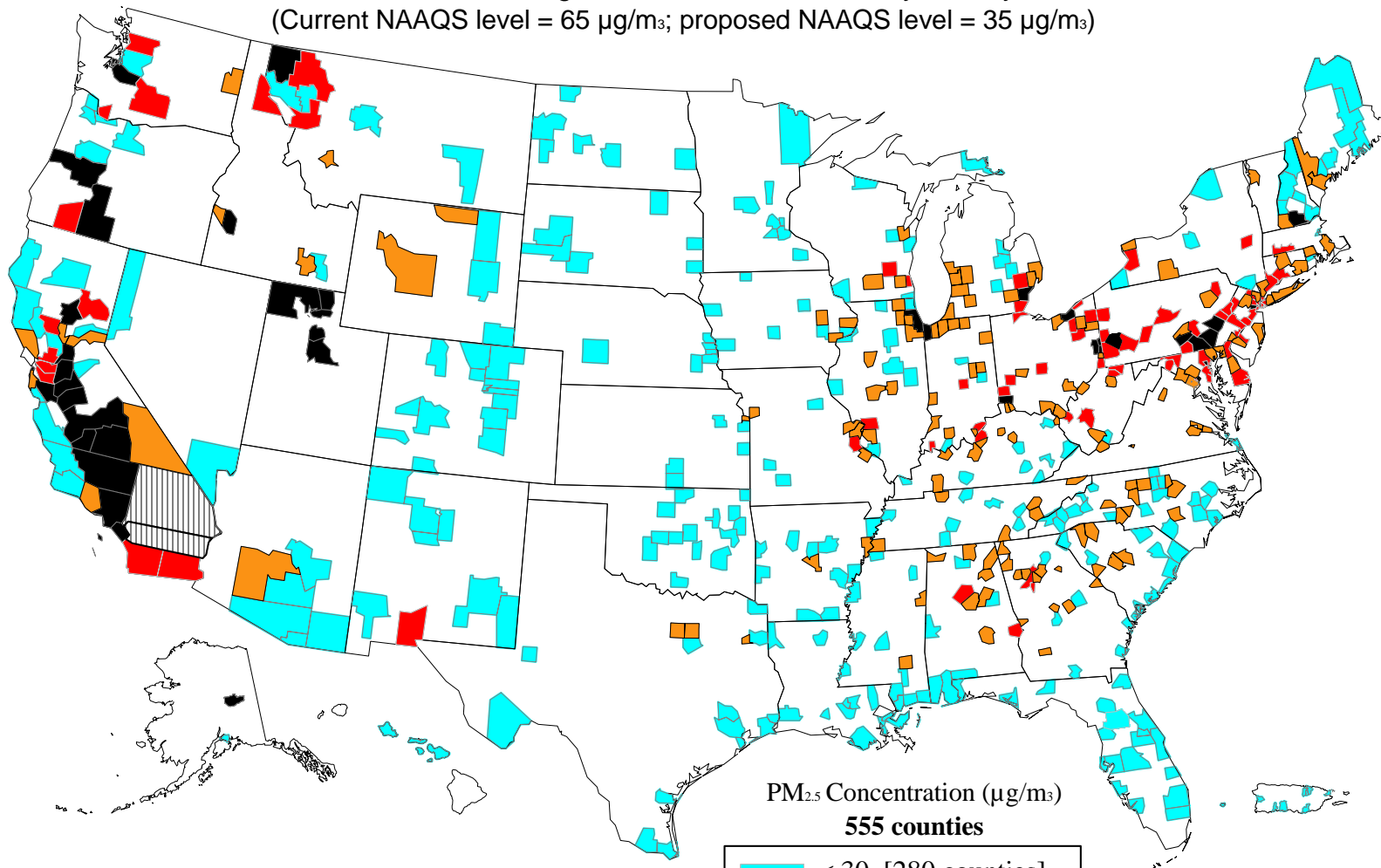
- All but two of the 68 counties are located in the 40 designated areas (39 nonattainment and one unclassifiable)

- The two additional counties are Salt Lake in Utah (15.1 µg/m³) and Russell in Georgia (15.3 µg/m³). The latter uses spatial averaging to meet the standard

PM_{2.5}

PM NAAQS Proposals - Ramifications

PM_{2.5} 24-hour Standard Design Value Concentrations By County, 2002-2004
(Current NAAQS level = 65 µg/m₃; proposed NAAQS level = 35 µg/m₃)



- Only two counties, Riverside (67 µg/m³) and San Bernardino (66 µg/m³) in California, have county maximum 24-hour design values in excess of the current 24-hour NAAQS level of 65 µg/m³.

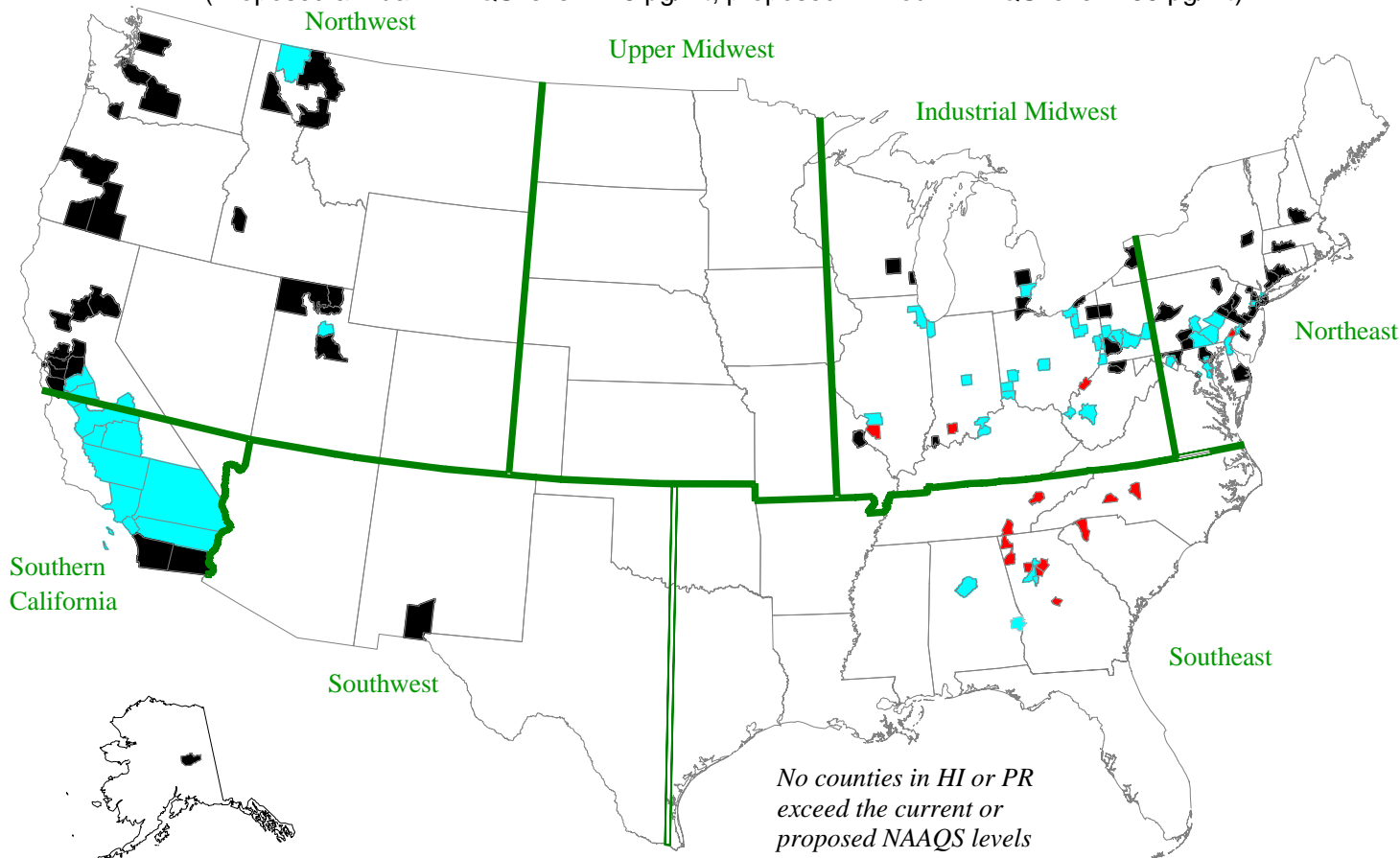
- A total of 122 counties have current 24-hour design values that exceed the proposed revised 24-hour NAAQS level of 35 µg/m³.

PM_{2.5}

PM NAAQS Proposals - Ramifications

Counties Exceeding One or Both Proposed PM_{2.5} NAAQS Levels, 2002-2004
(Proposed annual NAAQS level = 15 µg/m₃; proposed 24-hour NAAQS level = 35 µg/m₃)

- 137 counties exceed either one or both of the proposed NAAQS levels.
- The 69 black counties currently meet existing standards but would exceed the newly proposed levels
- The 68 counties in the other two categories violate current NAAQS levels and would also violate the proposed standards
- The number of counties that would exceed the proposed new PM_{2.5} standards is approximately double the number that exceed the current standards.
- About a third of the black 69 counties are located (entirely or partially) in current nonattainment areas as "contributing" counties, but most belong to additional (~37) metropolitan areas.
- Most of the potential new PM_{2.5} problem counties are located in the Northeast (26 counties), Northwest (25), or Industrial Midwest (14). Only a few are in Southern California (two), the Southwest (one), and outlying areas (one in Alaska). None are in the Southeast or Upper Midwest.



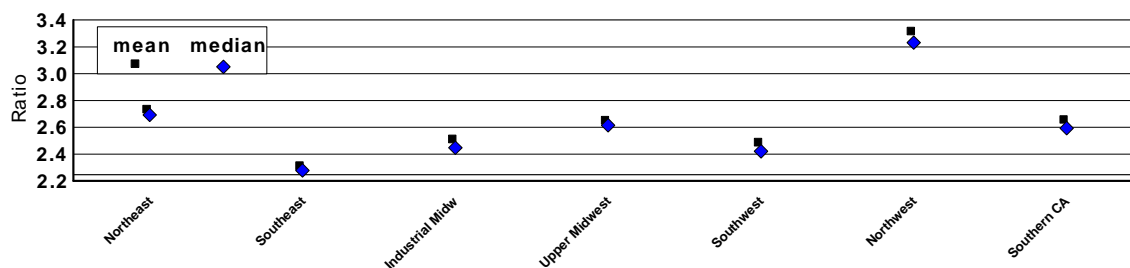
| | |
|--|---|
| | counties exceeding 15 µg/m ₃ (annual) and 35 µg/m ₃ (24-hour) [53 counties] |
| | counties exceeding 15 µg/m ₃ (annual) but not 35 µg/m ₃ (24-hour) [15 counties] |
| | counties exceeding 35 µg/m ₃ (24-hour) but not 15 µg/m ₃ (annual) [69 counties] * |

* Note: None of the solid-shaded counties exceed the current 65 µg/m₃ 24-hour NAAQS

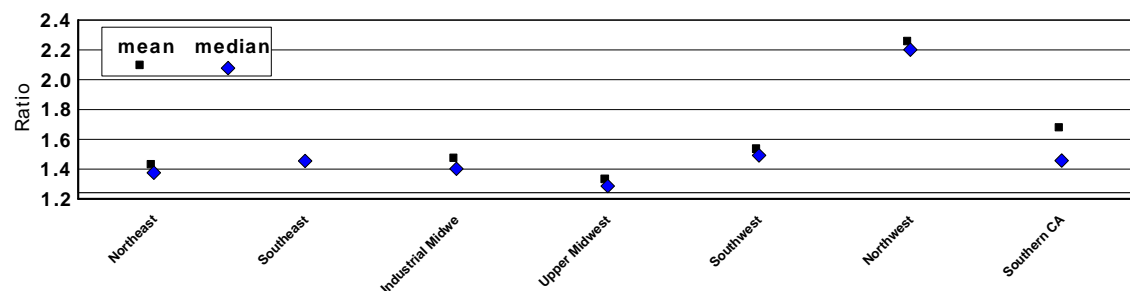
PM_{2.5}

PM NAAQS Proposals - Ramifications

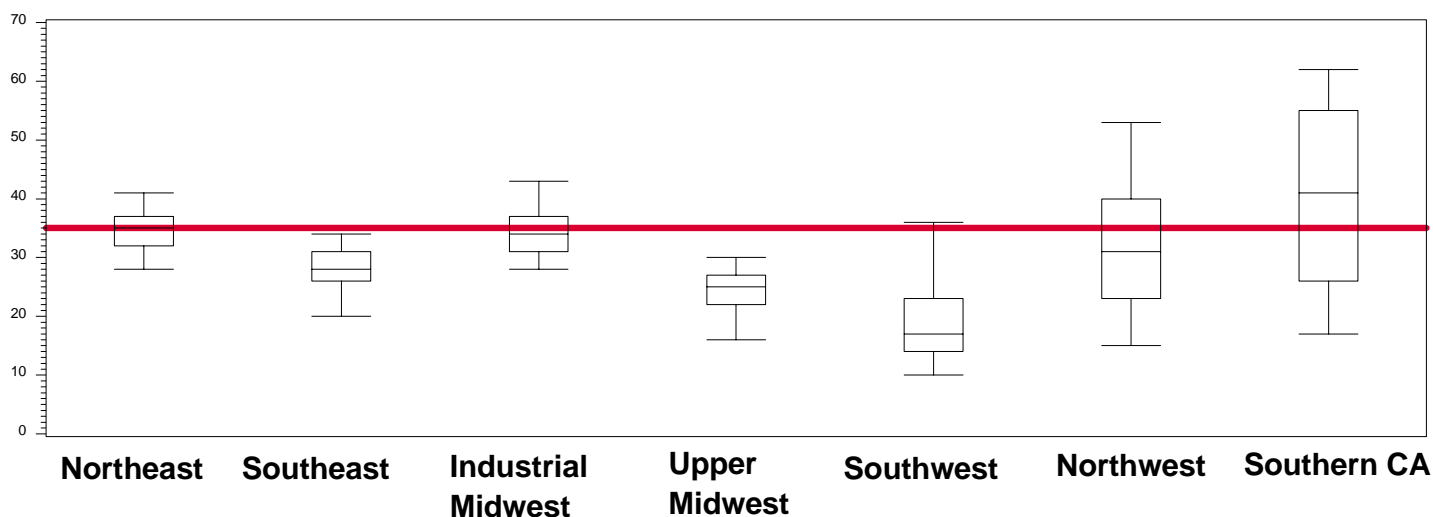
Peak (24-hr DV) to Mean (Annual DV) Ratio, by Region



Max Quarter Mean to Min Quarter Mean Ratio, by Region



Distribution of 24-hour DVs, by Region



- Why are the Northwest, Northeast, and Industrial Midwest regions potentially hit the hardest?

- Peaks are higher there!

- Northwest has highest peak to mean ratio (on average)

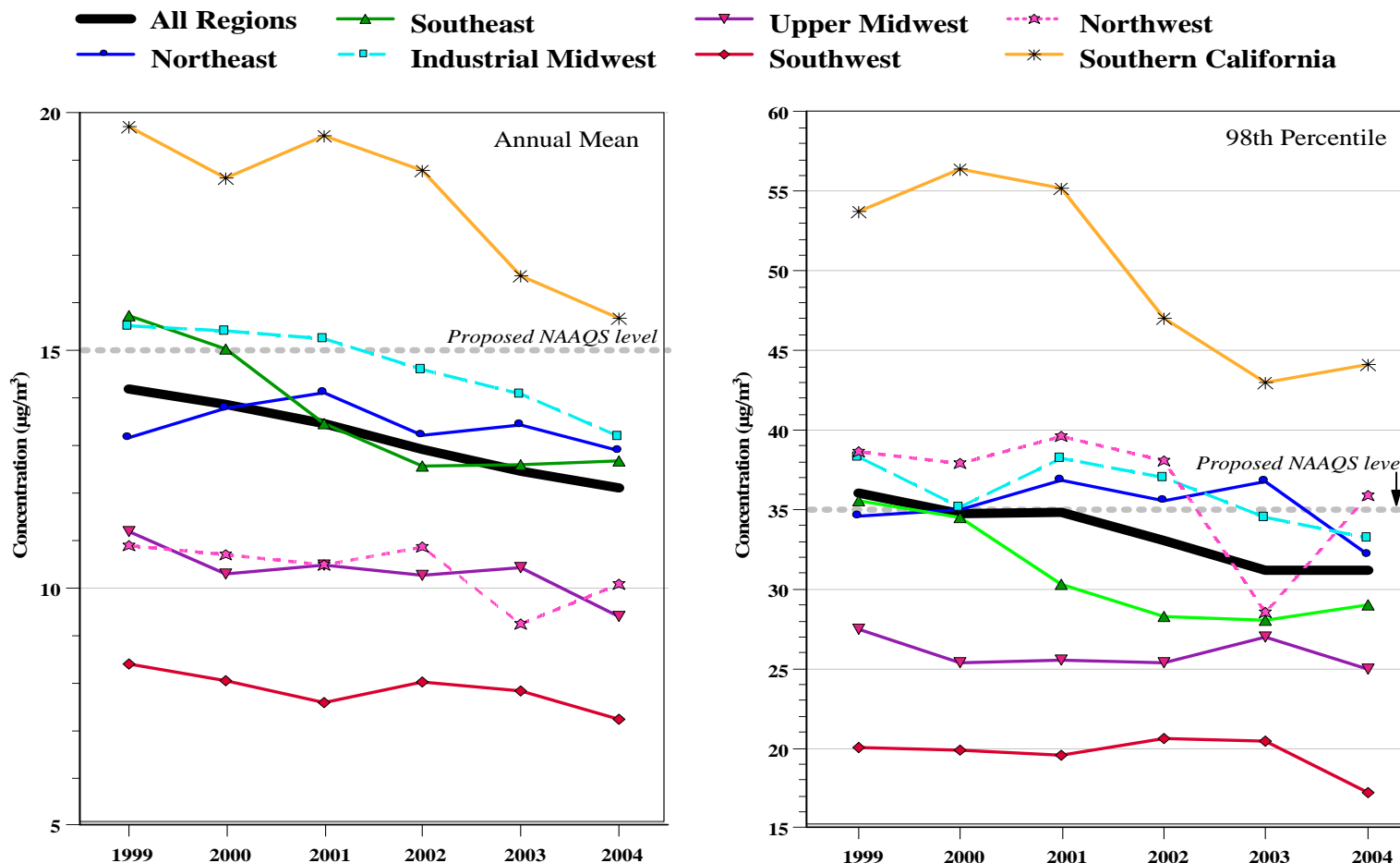
- Northwest has more seasonal variation than other regions

- Other than Southern CA (which has the highest 98th percentiles and highest means), those 3 regions have the most 98th percentiles over the proposed NAAQS level

PM_{2.5}

PM NAAQS Proposals - Ramifications

PM_{2.5} Annual Mean and 98th Percentile Concentration Trends by Region, 1999-2004



•A variety of local and national programs have helped reduce PM_{2.5} precursors and direct PM_{2.5} emissions over the past six years. National programs that affect regional emissions, such as EPA's Acid Rain Program, have contributed to declining sulfur dioxide (SO₂) emissions and, consequently, to lower PM_{2.5} sulfate concentrations, particularly in the Industrial Midwest and Southeast. National and regional ozone reduction programs, such as the NO_x SIP Call and mobile source control programs, have reduced emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO_x), both of which are PM_{2.5} precursors.

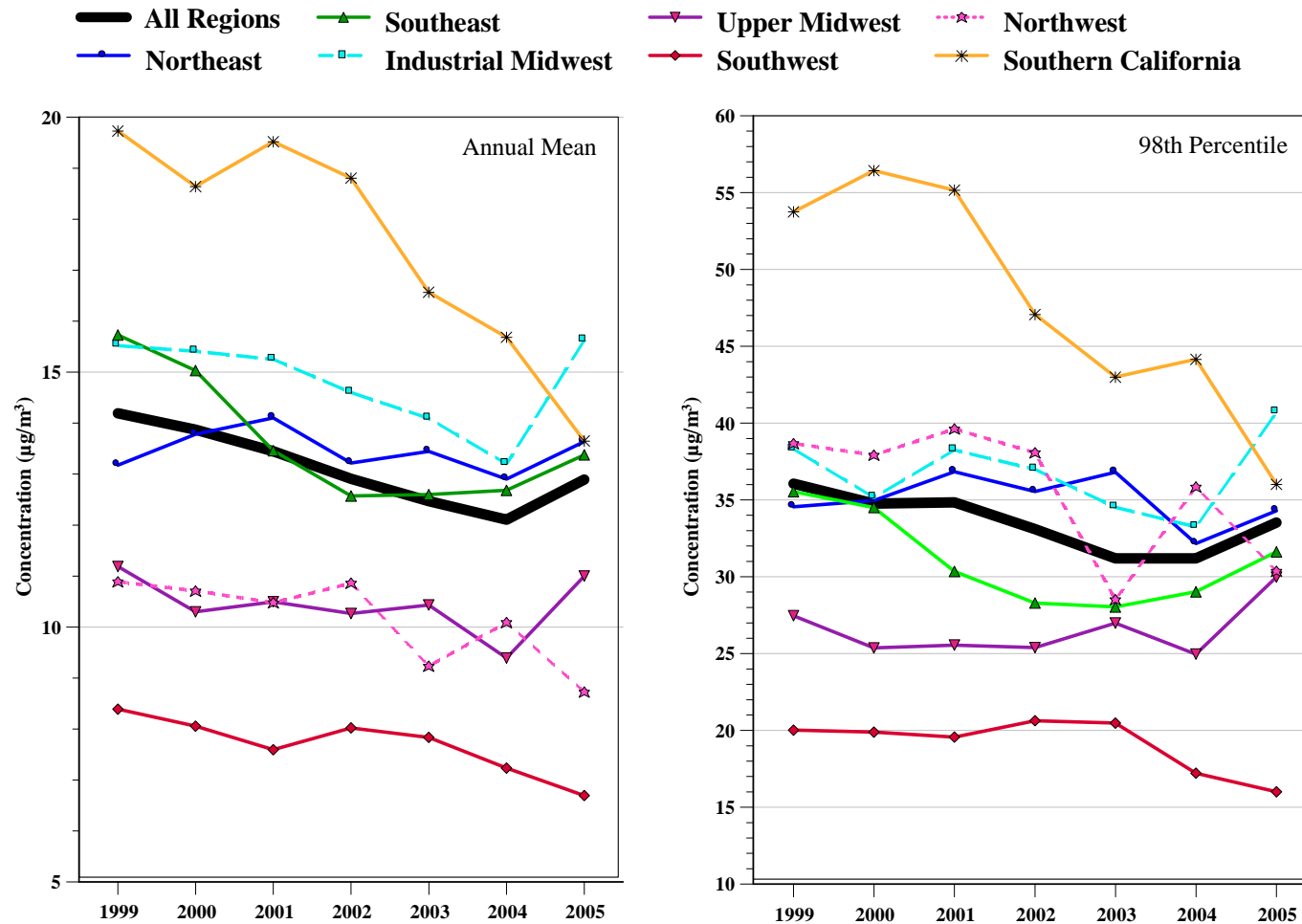
•From 1999 to 2004, national average annual mean concentrations declined about 15 percent. All regions had improvements in annual average PM_{2.5} concentration levels since 1999, but not uniformly. The greatest improvement was in Southern California, where concentrations are the highest.

•From 1999 to 2004, national average 98th percentile concentrations declined about 14 percent. As with the annual mean, all regions showed improvements over the six-year period. 98th percentile concentrations declined the most in the Southeast and Southern California. It appears that from 2003 to 2004, national average 98th percentile concentrations did not change.

PM_{2.5}

PM NAAQS Proposals - Ramifications

2005?



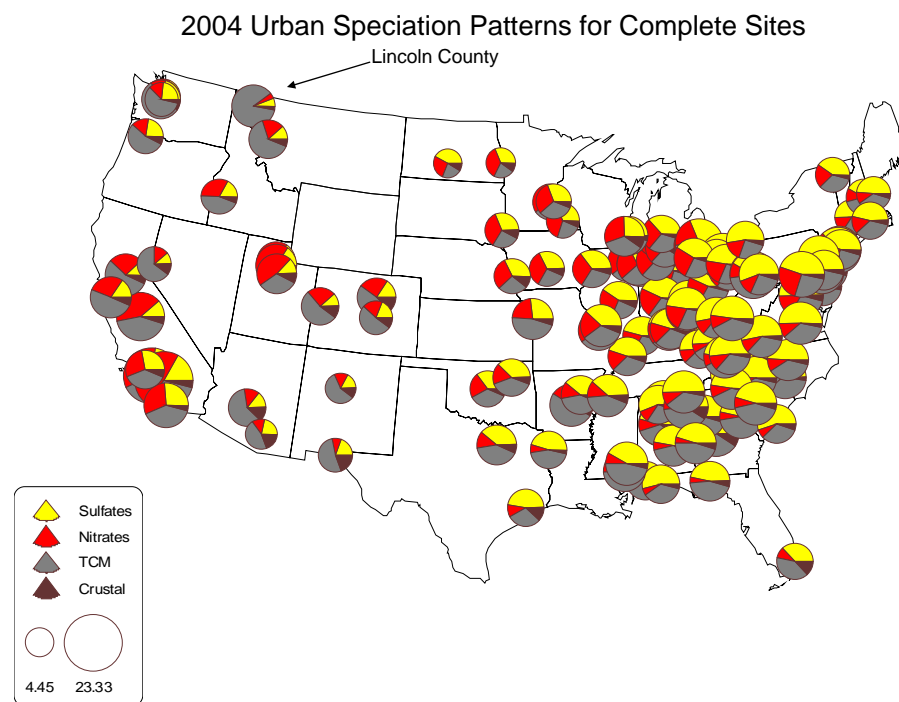
Warning: 2005 data not replete. Completeness not checked. From AQS 2/21/05.

- National levels of PM_{2.5} (avg and 98th) up in 2005 relative to 2004.
- All Eastern regions went up
- Most Western regions (3 of 4) went down

PM_{2.5}

PM NAAQS Proposals - Ramifications

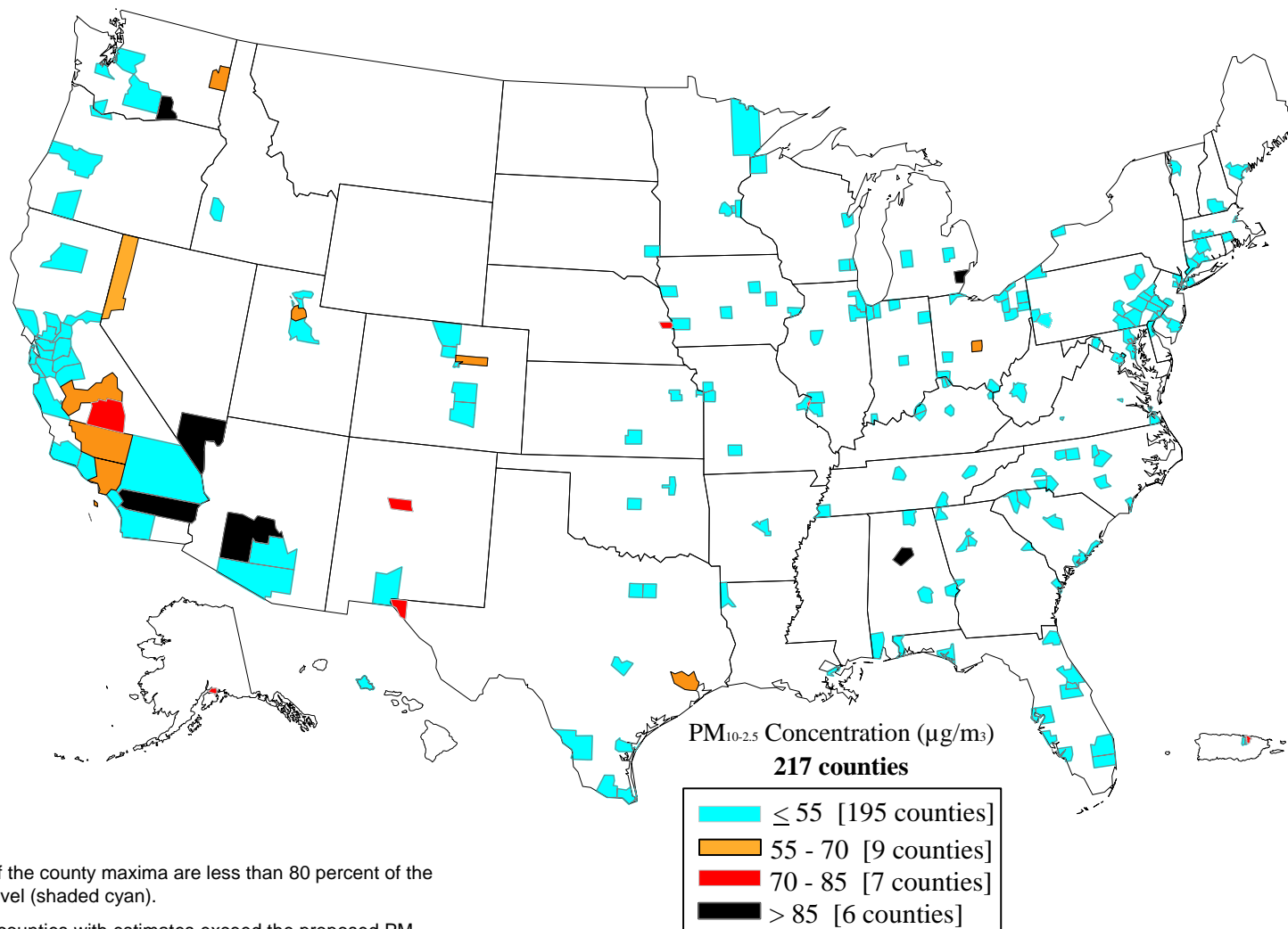
- In spite of 2005, overall PM_{2.5} levels are expected to decline in future years.
 - Programs such as the Clean Air Interstate Rule, the Clean Air Diesel Rule, the Clean Air Nonroad Diesel Rule, and the Clean Air Visibility Rule are expected to bring significant reductions in PM_{2.5} concentrations.
 - Model projections incorporating these rules indicate that by 2015 only about 50 percent of the 137 counties nationwide that would exceed the proposed PM_{2.5} NAAQS levels would still exceed those levels by that year.
- More than two-thirds of the counties in the East would attain the proposed new NAAQS levels by 2015 with the help of these rules. However, only 2 out of 17 of the 'violating' counties in WA, OR, ID, MT, and UT have 2015 projections meeting the proposed levels.
- Because of carbon!



PM_{10-2.5}

PM NAAQS Proposals - Ramifications

Estimated PM_{10-2.5} 24-hour "Design Value" Concentrations, 2002-2004
(Proposed NAAQS level = 70 µg/m₃)



- About 90 percent of the county maxima are less than 80 percent of the proposed NAAQS level (shaded cyan).

- Only 13 of the 217 counties with estimates exceed the proposed PM_{10-2.5} standard level of 70 µg/m₃. Four of these 13 counties are located in the Southwest; two are in Southern California; two are in the Industrial Midwest; two are in outlying areas; and one each is in the Northwest, the Southeast, and the Upper Midwest. None is in the Northeast.

PM NAAQS Proposals - Schedule

- On **December 20, 2005**, the EPA proposed revisions to the NAAQS and to monitoring requirements. Two separate proposals.
- On **January 17, 2006**, the proposals were published in the Federal Register.
- Public comments will be accepted for ninety days (until **April 17, 2006**).
 - On alternative indicator/forms/levels (distinct PM_{2.5} secondary)
- Public hearings to be held today, **March 8, 2006** (San Fran, Chicago, Philadelphia)
- EPA to consider public comments and promulgate final decisions on **September 27, 2006**
- PM_{2.5} network already running. Could designate areas in **2009** using 2006-2008 data.
- PM_{10-2.5} network implementation by January 1, 2009. Could designate areas in **2012** using 2009-2011 data.